



# Aging, Body Weight, and Their Effects on Body Satisfaction and Quality of Life

Tülay Tarsuslu Şimşek<sup>1</sup>, Eylem Tütün Yümin<sup>2</sup> and Meral Sertel<sup>3,\*</sup>

<sup>1</sup>Dokuz Eylül University, School of Physical Therapy and Rehabilitation, Izmir, Turkey

<sup>2</sup>Abant İzzet Baysal University, School of Physical Therapy and Rehabilitation, Bolu, Turkey

<sup>3</sup>Kirikkale University, Faculty of Health Sciences, Department of Physical Therapy and Rehabilitation, Kirikkale, Turkey

\*Corresponding author: Kirikkale University, Faculty of Health Sciences, Department of Physical Therapy and Rehabilitation, Kirikkale, Turkey. Tel: +90-3183573738, Fax: +90-2324124946. Email: fzt\_meralaksehir@hotmail.com

Received 2017 January 25; Revised 2017 May 12; Accepted 2017 June 03.

## Abstract

**Background:** Changes in body composition in advanced ages (i.e., physical, physiological, and social changes) may influence the perception of body image in the elderly population. In some studies, it is stated that negative body image is associated with the consequences of unhealthy physical and mental health status.

**Objectives:** The purpose of the study is to examine changes in body weight, body satisfaction, and quality of life in the elderly.

**Methods:** This descriptive analytical study was performed from July 2015 to April 2016 on individuals aged 45 years and above who lived in Kirikkale, Turkey. The participants were divided into four age groups of 45 - 59 years (group 1), 60 - 69 years (group 2), 70 - 79 years (group 3), and 80 years and above (group 4). Body satisfaction was evaluated using Body-Cathexis Scale (BCS), and the quality of life was evaluated using the Nottingham Health Profile (NHP).

**Results:** the highest body mass index (BMI) was found in the 60 - 69 years age group ( $29 \pm 4.72$  kg/cm<sup>2</sup>), whereas the lowest score was found to be in the individuals pertaining to the 80 years and above age group ( $26.53 \pm 4.53$  kg/cm<sup>2</sup>). BCS total scores were  $85.95 \pm 22.09$  in group 1,  $94.78 \pm 26.68$  in group 2,  $103.29 \pm 31.41$  in group 3, and  $107.28.35.84$  in group 4. A significant difference was found between the groups in terms of quality of life and body satisfaction ( $P < 0.05$ ). There was a positive correlation between BCS and NHP in groups 1, 2, and 3 ( $P < 0.05$ ). However, there was no correlation between BCS and NHP in group 4 ( $P > 0.05$ ).

**Conclusions:** Evaluations and practices performed for body weight control in middle-aged and older adults are of importance in terms of increasing the quality of life.

**Keywords:** Adults, Aging, Body-Cathexis Scale, Body Composition, Body Mass Index, Body Weight, Nottingham Health Profile, Quality of Life, Satisfaction

## 1. Background

Changes in body composition in advanced ages (i.e., physical, physiological, and social changes) are associated with alterations in the level of health and functional independence (1, 2). Changes caused by aging probably affect body image (3). The aging process is associated with a reduction of free fat mass, which consists of all residual tissues and substances including water, muscles, bones, connective tissues, and internal organs (4). This process is also associated with an increase in body fat; these changes in body composition may influence the perception of body image (3, 5, 6).

During the past two decades, studies regarding body image have gained importance, and there have been studies in the literature in relation to young children, young adults, and adults from different cultures. Various health

problems, eating disorders, and weight-related problems cause individuals to have body satisfaction problems. Body dissatisfaction is often regarded as the displeasure one feels about certain regions of his/her body, such as his/her legs, hip, elbow, and/or external appearance (physiognomy) (6). Negative body image is linked with the consequences of unhealthy physical and mental health status (7-9).

Body weight and body satisfaction in older adults have been dealt with in a few studies in recent years, the results of which are insufficient (10). In studies conducted on older adults, the importance of investigating changes in body satisfaction along with the aging process has been highlighted. The physical and physiological changes occurring along with aging in older adults may affect their body image and satisfaction, and hence, different aspects

of quality of life (6). Problems such as wrinkles that develop along with aging and weakening in mobility and physical capacity are experienced during aging, which can negatively affect body image, particularly in women. Physical changes such as weight gain, hair loss, loss of height, redistribution of body fat, and wrinkles on the skin may impact older adults' self-confidence (11). In some studies, it was concluded that older adults were more negatively affected in terms of body image satisfaction when compared with younger individuals. However, in some other studies conducted on this topic, it was observed that individuals aged 65 years and above had higher body satisfaction levels than those aged between 40 and 50 years (12, 13).

The relationship between weight and body satisfaction in different age groups has been examined in many studies (especially in adolescents), but there are limited studies on elderly individuals. At the same time, it was observed that multiple age group comparisons have not been included in a single study, and previous studies have included only one or two age group comparisons.

## 2. Objectives

In this study, we sought to evaluate body satisfaction in different age groups and examine the effects of body weight and aging on body satisfaction and the quality of life. In this study, it was also aimed to analyze the differences in body weight, body satisfaction, and the quality of life among middle-aged and older adults.

## 3. Methods

### 3.1. Design and Study Population

This descriptive analytical study was performed among individuals aged 45 years and above who lived in Kirikkale (living in the home environment), Turkey. The participants were selected by the simple random sampling method from July 2015 to April 2016. The participants comprised 418 adults [204 (48.8%) males and 214 (51.2%) females] with a mean age of  $60.84 \pm 11.59$  years (age range: 45 - 94 years).

The inclusion criteria consisted of age 45 years and above, lack of institutionalization, and the ability to understand and answer the questions asked and to give statements in an accurate way. Individuals who were institutionalized, had a medical history of mental or intellectual disorders, were aphasic, had severe dementia, or refused to participate in the study were excluded. All the participants provided informed consent for participation in the study. This study was evaluated and approved by

Kirikkale University Clinic Research Ethics Committee (No. 14/05/01.06.2015).

The sample size was determined 400 people using power analysis performed in Epi Info™ 7 (7.1.1.14) program with the power of 80% and a margin of error of 0.05 at 95% confidence level.

The individuals included in the study were divided into four age groups (as those aged 45 - 59, 60 - 69, 70 - 79, and 80 years and above) so as to be able to better analyze the changes observed along with the aging process. The results obtained were interpreted according to age distributions.

### 3.2. Instruments

The participants were assisted by a researcher to complete the evaluation form and the questionnaire. For illiterate individuals and those who had difficulty in reading, the questions were asked orally, and the answers given by the individual were recorded by the researcher.

The recommendations of the World Health Organization (14) were used to determine the degree of obesity, that is, underweight [body mass index (BMI) < 18.5 kg/m<sup>2</sup>], normal-weight (BMI = 18.50 - 24.99 kg/m<sup>2</sup>), overweight (BMI = 25.00 - 29.99 kg/m<sup>2</sup>), and obese (BMI > 30 kg/m<sup>2</sup>).

Weight was measured to the nearest 0.1 kg using a weighing scale with the participant dressed in indoor clothing without shoes. Height was measured to the nearest 0.1 cm using a wall-mounted stadiometer. BMI was calculated as weight (kg)/height (m)<sup>2</sup>.

Nottingham Health Profile (NHP) was used to evaluate health-related quality of life. The tool is a valid and reliable scale containing six different subcategories that test physical activity (PA), energy level (EL), pain (P), social isolation (SI), sleep (S), and emotional reactions (ER). Scores in each section can range from 0 to 100 with lower scores indicating lower levels of distress. In this study, the Turkish version of NHP developed by Kucukdeveci et al. was employed (15).

The Body Cathexis Scale (BCS) is a self-report questionnaire measuring the level of body satisfaction. The scale was translated into Turkish by Hovardaoğlu (16). Body satisfaction is evaluated based on a five-point Likert scale from the most negative attitude towards a body part or function to the most positive attitude toward a body part or function. The minimum possible total score is 40, and the maximum possible total score is 200. The cut-off score of this scale is 135. Obtaining a score of less than 135 demonstrates a decrease in an individual's satisfaction about his/her body parts or functions, whereas a score of 135 or more denotes an increase in the mentioned variable.

### 3.3. Statistical Analysis

Normal distribution of the data was examined using Kolmogorov-Smirnov/Shapiro-Wilk's test. Anthropometric and socio-demographic characteristics, body satisfaction, depression level, and health-related quality of life status of the participants are presented as numbers, percentages, means, and standard deviations. One-way analysis of variance (ANOVA) was used to compare BMI, BCS, and NHP values. When an overall significance was observed, pairwise post-hoc and Tukey's tests were performed. Levene's test was run to assess the homogeneity of the variances. The correlations among BMI, weight, height, body image, health-related quality of life, and depression were analyzed using Pearson's correlation coefficient.

## 4. Results

We found a significant difference among the groups in terms of age, height, and BMI ( $P < 0.01$ ). The highest BMI value was found in the group aged 60 - 69, whereas the lowest BMI value was found in those aged 80 years and above. Also, there was a significant difference in terms of the educational level, marital status, presence of a chronic disease, and the use of an ancillary equipment among the groups ( $P < 0.05$ ; Table 1).

A significant difference was observed in the quality of life and body satisfaction among the groups ( $P < 0.05$ ; Table 2). In the comparative analyses performed, all the sub-parameters of NHP and total NHP showed differences among the groups ( $P < 0.05$ ; Table 2). The group that was different in energy level, pain, emotional reaction, and sleep parameters was group 1 (aged 45 - 59). Younger individuals were observed to score higher in the parameters of quality of life ( $P < 0.05$ ). However, total BCS value was found to be lower in the group aged between 45 - 59 years ( $P < 0.05$ ; Table 2). Body satisfaction was determined to have increased along with the aging process.

In the correlational analysis performed, a positive relationship was found between body satisfaction and energy level, pain, emotional reaction, physical activity, and total NHP values of group 1 ( $P < 0.05$ ). In addition, in the individuals in group 1, a negative correlation was noted between BMI and weight and pain; yet, a positive correlation was observed between BMI and height ( $P < 0.05$ ; Table 3). On the other hand, a positive correlation was found between body satisfaction and age, energy level, pain, emotional reaction, physical activity, and total NHP in the individuals in group 2 ( $P < 0.05$ ). In group 3, however, a negative correlation was found between body satisfaction and height; yet, a positive correlation was seen between body satisfaction and energy level, pain, emotional reaction, physical activity, and total NHP in this group ( $P < 0.05$ ).

In group 3, a negative correlation was found between total NHP and BMI, height, weight, energy level, pain, social isolation, sleep, and physical activity ( $P < 0.05$ ; Table 4). In the individuals in group 4, on the other hand, the correlation between body satisfaction and energy level and physical activity was in a positive direction, whereas the correlation between BMI and weight was in a negative direction ( $P < 0.05$ ).

## 5. Discussion

The results of our study suggested that with advancing age, body weight declined and that body satisfaction in older adults was higher than that of younger adults; yet, there was also a decrease in the values pertaining to the quality of life in this population.

In our study, a significant difference was observed in height and BMI among the groups. Although the difference was not significant, the lowest weight was observed in those aged 80 years and above. These results are in agreement with those of other studies (1, 17). In previous studies, it was reported that weight loss in older adults is caused by various reasons such as hormonal changes, deficiency in protein consumption, changes in protein metabolism, and decrease in the muscular mass due to muscular atrophy, which may lead to morbidity and physical inability (18, 19). In addition, educational level, age, marital status, health condition, employment status, place of residence, and gender were stated to affect BMI. In former studies, it was also noted that low educational level and being married were associated with high BMI values in male subjects (20-23). It was also shown that place of residence, employment status, and chronic diseases were highly associated with obesity in women and men (21).

Padez reported that adult males living in villages were at a lower risk of getting overweight than those living in cities (22). In contrast, Tchicaya and Lorentz showed in their study that the risk of getting overweight in adults living outside urban areas was even higher than others (24). Our findings reflected a difference in educational status, chronic diseases, and marital status among the groups. BMI in divorced older adults was higher, while their educational level was lower than others.

BMI in older adults with chronic diseases was significantly lower than younger individuals. In previous studies, the relationship between socio-economic factors and BMI was examined in a single age group. In our study, however, the relationship between different age groups and BMI was examined, and it was determined that BMI was lower in older adults and there was a correlation between BMI and age only in those aged 45 - 59 years.

**Table 1.** Socio-Demographic Data of the Subjects<sup>a</sup>

	Group 1, N = 154	Group 2, N = 160	Group 3, N = 79	Group 4, N = 25	F <sup>b</sup> , $\chi^2$ <sup>c</sup>	P Value <sup>d</sup>
<b>Age, y</b>	47.82 ± 4.53	64.03 ± 2.91	72.98 ± 2.45	82.2 ± 3.62	1324.60	< 0.01
Range	45 - 59	60 - 69	70 - 79	≥ 80		
<b>Height, cm</b>	1.66 ± 0.082	1.63 ± 0.08	1.62 ± 0.11	1.67 ± 0.08	10.28	< 0.01
<b>Weight, kg</b>	77.85 ± 12.61	77.49 ± 11.34	73.83 ± 13.21	74.72 ± 15.19	2.26	0.08
<b>BMI, kg/cm<sup>2</sup></b>	27.47 ± 4.85	29 ± 4.72	28.03 ± 5.76	26.53 ± 4.53	3.40	0.01
<b>Gender</b>					4.20	0.24
Female	80 (51.9)	73 (45.6)	35 (44.3)	16 (64)		
Male	74 (48.1)	87 (54.4)	44 (55.7)	9 (36)		
<b>Educational level</b>					88.78	< 0.01
Primary school	51 (33.1)	68 (42.5)	37 (46.8)	15 (60)		
Secondary school	26 (16.9)	28 (17.5)	12 (15.2)	3 (12)		
High school	36 (23.4)	26 (16.3)	5 (6.3)	1 (4)		
Collage	32 (20.8)	12 (7.5)	-	-		
Master's degree	5 (3.2)	1 (0.6)	-	-		
Illiterate	4 (2.5)	25 (15.7)	25 (31.6)	6 (24)		
<b>Civil status</b>					54.69	< 0.01
Married	140 (90.9)	130 (81.3)	55 (69.6)	15 (60)		
Single	9 (5.8)	2 (1.3)	-	-		
Widowed/divorced	5 (3.2)	28 (17.5)	24 (30.4)	10 (40)		
<b>Living area</b>					14.49	0.10
Village	12 (7.8)	15 (9.4)	12 (15.2)	7 (28)		
Town	1 (0.6)	4 (2.5)	2 (2.5)	1 (4)		
County	40 (26)	38 (23.8)	16 (20.3)	3 (12)		
City	101 (65.6)	103 (64.4)	49 (62)	14 (56)		
<b>Chronic disease</b>					64.86	< 0.01
Hypertension	17 (11)	46 (28.8)	25 (31.6)	8 (32)		
Diabetes mellitus	10 (6.5)	22 (13.8)	11 (13.9)	3 (12)		
Rheumatic diseases	5 (3.2)	18 (11.3)	11 (13.9)	2 (8)		
Chronic obstructive pulmonary disease	2 (1.3)	3 (1.9)	-	1 (4)		
Orthopedic diseases	42 (27.3)	10 (6.3)	4 (5.1)	1 (4)		
Coronary artery disease	-	5 (3.1)	-	1 (4)		
Heart failure	-	5 (3.1)	3 (3.8)	3 (12)		
None	78 (50.6)	53 (33.1)	25 (31.6)	6 (24)		
<b>Use of assistive devices</b>					65.930	< 0.01
Yes	1 (0.6)	13 (8.1)	25 (31.6)	9 (36)		
No	153 (99.4)	147 (91.9)	54 (68.4)	16 (64)		

Abbreviation: BMI, body mass index.

<sup>a</sup>Values are expressed as mean ± SD or No. (%).<sup>b</sup>F = ANOVA.<sup>c</sup> $\chi^2$  = chi-square test.<sup>d</sup>P < 0.05.

**Table 2.** The Comparison of Health-Related Quality of Life and Body Satisfaction Between the Groups

Quality of Life (NHP)	Group 1, N = 154	Group 2, N = 160	Group 3, N = 79	Group 4, N = 25	F	P Value
Age, y	45 - 59	60 - 69	70 - 79	≥ 80		
Energy level	15.94 ± 15.63	40.65 ± 33.96	48.76 ± 33.71	55.80 ± 33.87	29.79	< 0.01
Pain	11.49 ± 17.29	40.07 ± 30.46	47.83 ± 32.71	44.68 ± 32.03	45.23	< 0.01
Emotional reaction	13.72 ± 18.93	25.04 ± 24.87	28.61 ± 25.26	35.26 ± 26.71	12.46	< 0.01
Social isolation	9.80 ± 18.68	16.21 ± 25.14	20.23 ± 24.37	32.68 ± 35.58	8.51	< 0.01
Sleep	11.44 ± 18.38	31.23 ± 30.02	37.06 ± 30.25	42.14 ± 32.68	25.11	< 0.01
Physical mobility	12.12 ± 16.93	29.63 ± 20.70	41.78 ± 24.58	46.67 ± 32.76	46.28	< 0.01
Total	74.24 ± 88.18	180.02 ± 117.93	225.04 ± 123.58	257.39 ± 150.06	47.15	< 0.01
BCS	85.95 ± 22.09	94.78 ± 26.68	103.29 ± 31.41	107.28 ± 35.84	9.93	< 0.01

Abbreviation: BCS, body cathexis scale.

In the conducted studies, it was observed that body image and body satisfaction in individuals of advanced age, particularly in women, were higher than those of younger ones (13), which was explained by the fact that those in their advanced ages had adapted themselves to the changes in their bodies and accepted those body changes. In our study, we found a significant difference in terms of body satisfaction and the quality of life among the age groups.

Even though body satisfaction in none of the groups proved to be rather high (the cut-off value for BCS: 135 points), it was observed that with advancing, body satisfaction also increased in comparison to younger individuals. Although BMI was determined to be higher in the 60 - 69 and 70 - 79 ages groups, body satisfaction of younger individuals (age group: 40 - 59 years) was determined to be higher. These results suggest that body satisfaction seen along with the aging process does not stem from only BMI and body weight. The period between 40 and 50 years is when menopause and hormonal and weight changes, along with changes in physical appearance (wrinkles and gray hair), occur in women.

Adaptation of individuals to constitutional bodily changes is in proportion to their body dissatisfaction. Not only do these changes occur in women but also in men. In our study, although there was no difference among the groups in terms of gender distribution, the number of female subjects in the age groups 40-59 years and 80 years and above was higher.

Informing and supporting middle-aged individuals about the changes occurring in the body will allow them to be at peace with their bodies and to boost their self-confidence levels. In such a case, the individual will not suffer from stress due to the changes occurring in his/her body and will experience less emotional problems (e.g., de-

pression and anxiety) caused by physical changes.

Sonati et al. conducted a study to evaluate the relationship between the quality of life, body image, and body composition. They assigned the individuals to three groups as those aged 60 - 64 (n = 21), 65 - 69 (n = 29), and 70 years and above (n = 31). They found no significant difference among these three groups in terms of the general quality of life, health, and body image. However, a positive correlation was observed between the acceptance of physical appearance, lower free-fat mass, body image, and health in those aged above 70 years. Free-fat mass was found to be more common in those aged 65 - 69 years. In the same way, a positive correlation was found between body image, health and free-fat mass (1).

In a systematic review conducted by Roy and Payette, it was understood that the western elderly were disgruntled with their own bodies and had misperceived their body image. This consensus about elderly body image is similar to the body image of younger populations. In the same study, the specific health-related problems in seniors were found to be associated with negative body image (7).

In a study conducted by Kim et al. it was reported that BMI and race/ethnicity had a major effect on self-rated mental health (SRMH), in addition to which they pointed out the fact that understanding the relationship between BMI and mental health would be helpful in the treatment of individuals with unhealthy weight (25). In the study, it was observed that decreased energy level, physical activity, and quality of life were experienced along with the aging process and that emotional problems were experienced more along with social isolation. Body satisfaction in those aged 40 - 59, 60 - 69, and 70 - 79 years was associated with all the parameters of NHP, except for sleep. On the other hand, body satisfaction in those aged 80 years and above was associated with body weight, BMI, energy

**Table 3.** Correlation Analysis in Group 1 and Group 2

Group 1	Group 2											
	Age	BMI	Height	Weight	ES	P	ER	SI	S	FA	NHPTot	BCS
<b>Age</b>												
r	1	-0.09	-0.01	0.05	0.03	0.07	-0.09	-0.06	0.02	0.20 <sup>a</sup>	0.05	0.17 <sup>a</sup>
P value		0.21	0.83	0.47	0.68	0.33	0.23	0.44	0.77	0.01	0.47	0.02
<b>BMI</b>												
r	0.27 <sup>b</sup>	1	0.22 <sup>b</sup>	-0.40 <sup>b</sup>	-0.24 <sup>b</sup>	-0.26 <sup>b</sup>	-0.05	-0.05	-0.04	-0.28 <sup>b</sup>	-0.22 <sup>b</sup>	-0.08
P value	< 0.01		0.05	0	0.02	0.01	0.95	0.47	0.59	< 0.01	0.04	0.28
<b>Height</b>												
r	0.25 <sup>b</sup>	0.29 <sup>b</sup>	1	0.76 <sup>b</sup>	0.08	0.03	0.22 <sup>b</sup>	0.04	-0.03	-0.02	0.02	0.10
P value	< 0.01	< 0.01		< 0.01	0.31	0.70	0.04	0.58	0.67	0.74	0.74	0.18
<b>Weight</b>												
r	0.10	-0.31 <sup>b</sup>	0.76 <sup>b</sup>	1	0.24 <sup>b</sup>	0.21 <sup>b</sup>	0.24 <sup>b</sup>	0.08	0.04	0.15	0.19 <sup>a</sup>	0.13
P value	0.20	< 0.01	< 0.01		0.02	0.07	0.02	0.28	0.57	0.05	0.01	0.08
<b>ES</b>												
r	0.14	-0.07	0.11	0.08	1	0.63 <sup>b</sup>	0.48 <sup>b</sup>	0.39 <sup>b</sup>	0.25 <sup>b</sup>	0.54 <sup>b</sup>	0.78 <sup>b</sup>	0.30 <sup>b</sup>
P value	0.07	0.35	0.14	0.31		< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01
<b>P</b>												
r	0.33 <sup>b</sup>	-0.17 <sup>a</sup>	0.05	0.14	0.32 <sup>b</sup>	1	0.42 <sup>b</sup>	0.27 <sup>b</sup>	0.42 <sup>b</sup>	0.71 <sup>b</sup>	0.79 <sup>b</sup>	0.34 <sup>b</sup>
P value	< 0.01	0.02	0.51	0.06	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
<b>ER</b>												
r	0.42 <sup>b</sup>	0.05	0.14	0.08	0.49 <sup>b</sup>	0.45 <sup>b</sup>	1	0.63 <sup>b</sup>	0.37 <sup>b</sup>	0.26 <sup>b</sup>	0.6 <sup>b</sup>	0.17 <sup>a</sup>
P value	< 0.01	0.52	0.07	0.32	< 0.01	< 0.01		< 0.01	< 0.01	0.01	< 0.01	0.03
<b>SI</b>												
r	0.23 <sup>b</sup>	0.04	-0.06	-0.08	0.28 <sup>b</sup>	0.32 <sup>b</sup>	0.60 <sup>b</sup>	1	0.29 <sup>b</sup>	0.24 <sup>b</sup>	0.56 <sup>b</sup>	0.15
P value	< 0.01	0.55	0.46	0.30	< 0.01	< 0.01	< 0.01		< 0.01	0.02	< 0.01	0.05
<b>S</b>												
r	0.24 <sup>b</sup>	-0.08	0.04	0.07	0.27 <sup>b</sup>	0.45 <sup>b</sup>	0.39 <sup>b</sup>	0.31 <sup>b</sup>	1	0.23 <sup>b</sup>	0.57 <sup>b</sup>	0.13
P value	< 0.01	0.30	0.59	0.35	< 0.01	< 0.01	< 0.01	< 0.01		0.03	< 0.01	0.09
<b>FA</b>												
r	0.33 <sup>b</sup>	-0.07	0.14	0.14	0.46 <sup>b</sup>	0.49 <sup>b</sup>	0.49 <sup>b</sup>	0.27 <sup>b</sup>	0.32 <sup>b</sup>	1	0.68 <sup>b</sup>	0.40 <sup>b</sup>
P value	< 0.01	0.37	0.07	0.06	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01
<b>NHPTot</b>												
r	0.62 <sup>b</sup>	0.06	0.15	0.08	0.59 <sup>b</sup>	0.63 <sup>b</sup>	0.77 <sup>b</sup>	0.55 <sup>b</sup>	0.58 <sup>b</sup>	0.67 <sup>b</sup>	1	0.31 <sup>b</sup>
P value	< 0.01	0.43	0.06	0.27	< 0.01	0	< 0.01	< 0.01	< 0.0	< 0.01		< 0.01
<b>BCS</b>												
r	-0.02	-0.62 <sup>b</sup>	-0.1	-0.03	0.23 <sup>b</sup>	0.27 <sup>b</sup>	0.22 <sup>b</sup>	0.08	0.13	0.19 <sup>a</sup>	0.018 <sup>a</sup>	1
P value	0.77	0.01	0.21	0.64	0.03	0.01	0.05	0.30	0.08	0.01	0.01	

Abbreviations: BCS, body cathexis scale; BMI, body mass index; EL, energy level; ER, emotional reaction; NHP, Nottingham health profile; NHPTot: Nottingham health profile total score; P, pain; PA, physical activity; S, sleep; SI, social isolation.

<sup>a</sup>P < 0.05.

<sup>b</sup>P < 0.01; Pearson's correlation analyses.

**Table 4.** Correlation Analysis in Group 3 and Group 4

Group 4	Group 3											
	Age	BMI	Height	Weight	ES	P	ER	SI	S	FA	NHPTot	BCS
<b>Age</b>												
r	1	-0.13	-0.02	0.14	-0.01	0.07	-0.08	0.08	0.02	-0.03	0.01	0.08
P value		0.23	0.85	0.20	0.88	0.49	0.46	0.45	0.79	0.76	0.9	0.44
<b>BMI</b>												
r	-0.15	1	0.37 <sup>a</sup>	-0.28 <sup>b</sup>	-0.24 <sup>b</sup>	-0.47 <sup>a</sup>	-0.17	-0.25 <sup>b</sup>	-0.29 <sup>a</sup>	-0.29 <sup>a</sup>	-0.37 <sup>a</sup>	0.03
P value	0.46		0.01	0.01	0.02	< 0.01	0.13	0.02	0.08	0.08	0.01	0.78
<b>Height</b>												
r	0.01	0.59 <sup>a</sup>	1	0.71 <sup>a</sup>	0.17	0.08	-0.01	0.06	-0.01	0.09	0.07	-0.28 <sup>b</sup>
P value	0.95	0.02		< 0.01	0.11	0.94	0.88	0.55	0.91	0.93	0.51	0.01
<b>Weight</b>												
r	0.13	0.06	0.82 <sup>a</sup>	1	0.26 <sup>b</sup>	0.33 <sup>a</sup>	0.08	0.24 <sup>b</sup>	0.15	0.13	0.29 <sup>a</sup>	-0.06
P value	0.51	0.75	0		0.01	0.03	0.45	0.02	0.17	0.22	0.08	0.56
<b>ES</b>												
r	0.06	-0.33	-0.28	-0.09	1	0.49 <sup>a</sup>	0.49 <sup>a</sup>	0.29 <sup>a</sup>	0.50 <sup>a</sup>	0.63 <sup>a</sup>	0.79 <sup>a</sup>	0.44 <sup>a</sup>
P value	0.75	0.09	0.16	0.64		< 0.01	< 0.01	0.08	< 0.01	< 0.01	< 0.01	< 0.01
<b>P</b>												
r	-0.18	-0.24	-0.17	0.04	0.66 <sup>a</sup>	1	0.40 <sup>a</sup>	0.29 <sup>a</sup>	0.43 <sup>a</sup>	0.53 <sup>a</sup>	0.72 <sup>a</sup>	0.29 <sup>a</sup>
P value	0.38	0.24	0.39	0.98	< 0.01		< 0.01	0.09	< 0.01	< 0.01	< 0.01	0.07
<b>ER</b>												
r	-0.10	0.01	0.03	0.05	0.65 <sup>a</sup>	0.4 <sup>b</sup>	1	0.50 <sup>a</sup>	0.46 <sup>a</sup>	0.55 <sup>a</sup>	0.74 <sup>a</sup>	0.34 <sup>a</sup>
P value	0.62	0.96	0.86	0.80	< 0.01	0.03		< 0.01	< 0.01	< 0.01	< 0.01	0.02
<b>SI</b>												
r	-0.22	-0.15	-0.14	-0.05	0.58 <sup>a</sup>	0.60 <sup>a</sup>	0.66 <sup>a</sup>	1	0.19	0.44 <sup>a</sup>	0.58 <sup>a</sup>	0.19
P value	0.27	0.47	0.47	0.78	0.02	0.01	< 0.01		0.08	< 0.01	< 0.01	0.08
<b>S</b>												
r	0.16	-0.23	-0.35	-0.28	0.44 <sup>b</sup>	0.35	0.48 <sup>b</sup>	0.35	1	0.28 <sup>b</sup>	0.67 <sup>a</sup>	0.02
P value	0.44	0.25	0.08	0.16	0.02	0.08	0.01	0.07		0.01	< 0.01	0.83
<b>FA</b>												
r	0.11	-0.22	-0.26	-0.09	0.75 <sup>a</sup>	0.61 <sup>a</sup>	0.46 <sup>b</sup>	0.39	0.31	1	0.75 <sup>a</sup>	0.57 <sup>a</sup>
P value	0.58	0.28	0.19	0.64	< 0.01	0.01	0.01	0.05	0.13		< 0.01	< 0.01
<b>NHPTot</b>												
r	-0.00	-0.30	-0.31	-0.14	0.90 <sup>a</sup>	0.76 <sup>a</sup>	0.74 <sup>a</sup>	0.75 <sup>a</sup>	0.66 <sup>a</sup>	0.73 <sup>a</sup>	1	0.43 <sup>a</sup>
P value	0.96	0.14	0.12	0.49	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		< 0.01
<b>BCS</b>												
r	-0.09	-0.12	0.23	-0.62 <sup>a</sup>	0.40 <sup>b</sup>	0.30	0.04	0.10	0.13	0.47 <sup>b</sup>	0.31	1
P value	0.64	0.11	0.24	0.01	0.04	0.14	0.81	0.62	0.52	0.04	0.12	

Abbreviations: BCS, body cathexis scale; BMI, body mass index; EL, energy level; ER, emotional reaction; NHP, Nottingham health profile; NHPTot: Nottingham health profile total score; P, pain; PA, physical activity; S, sleep; SI, social isolation.

<sup>a</sup>P < 0.01; Pearson's correlation analyses.

<sup>b</sup>P < 0.05.

level, and physical activity level.

A positive body image is also an important parameter that affects the participation of the individual in physical activities (26). In a study conducted by An and Shi on middle-aged and older adults, it was observed that there was a correlation between body weight and functional independence and that mobility limitations were more common in overweight older adults, which negatively affected daily life activity-independence and impaired the quality of life (27).

In our study, the lowest BMI was seen in the individuals of the advanced age group (80 years and above). However, when compared to other conducted studies, BMI values and overweight rate were high.

Excessive weight gain and obesity, when coupled with the changes in bodily systems along with aging (e.g., muscular dystrophy and balancing problems), may adversely affect the energy level and activity participation of an individual, which is also a significant finding suggesting that body dissatisfaction in older adults is much more influenced by the parameters that affect activity participation. While body satisfaction in younger individuals was affected by the parameters such as the emotional reaction and the social isolation, body satisfaction in the advanced ages was more affected by the parameters involving physical performance and participation in activities. Since obesity increases energy consumption, it may undermine social participation of older adults. For this reason, body weight should be considerably dwelled on in geriatric rehabilitation. Excessive weight gain and obesity in advanced ages affect the quality of life to a considerable degree due to activity limitations rather than dissatisfaction with external appearance. Individuals can be more influenced by the effects of weight on their health.

The strength of this study is that individuals in different age groups were included in the study and the results were presented comparatively in terms of age groups. The fact that there is a limited number of studies conducted on this subject is the other strong aspect of our study in terms of content. Our study provides a different perspective on the effects of old age and the physical and physiological changes occurring in the body during the aging process. In this regard, our study has provided important results that can be used as a reference in the literature. In the literature, the number of comparative studies examining the effects of body weight, body satisfaction, and quality of life in different age groups is very limited; thus, our work can make significant contributions to the literature. The limitation of our study was that a small number of elderly individuals were included in the study. Accordingly, we recommend conducting further studies with larger sample sizes.

### 5.1. Conclusions

Weight problems experienced in older adults are quite common. Along with advancing age, weight problems can lead to activity limitation and impair the quality of life to a considerable extent. Proper weight management during aging and early assessment of physical problems in overweight and obese middle-aged and older adults are warranted to prevent functional limitation and to enhance health-related quality of life. Further comparative studies on this issue are required.

### Footnotes

**Authors' Contribution:** The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Conflict of Interests:** It is not declared by the authors.

**Financial Disclosure:** It is not declared financial disclosure by the authors.

**Funding/Support:** This study was conducted in Kırıkkale, Turkey.

### References

1. Sonati JG, Modeneze DM, Vilarta R, Maciel ES, Boccaletto EM, da Silva CC. Body composition and quality of life (QoL) of the elderly offered by the "University Third Age" (UTA) in Brazil. *Arch Gerontol Geriatr.* 2011;**52**(1):e31-5. doi: [10.1016/j.archger.2010.04.010](https://doi.org/10.1016/j.archger.2010.04.010). [PubMed: [20452687](https://pubmed.ncbi.nlm.nih.gov/20452687/)].
2. Zeng P, Wu S, Han Y, Liu J, Zhang Y, Zhang E, et al. Differences in body composition and physical functions associated with sarcopenia in Chinese elderly: Reference values and prevalence. *Arch Gerontol Geriatr.* 2015;**60**(1):118-23. doi: [10.1016/j.archger.2014.08.010](https://doi.org/10.1016/j.archger.2014.08.010). [PubMed: [25440136](https://pubmed.ncbi.nlm.nih.gov/25440136/)].
3. Lewis DM, Cachelin FM. Body image, body dissatisfaction, and eating attitudes in midlife and elderly women. *Eat Disord.* 2001;**9**(1):29-39. doi: [10.1080/106402601300187713](https://doi.org/10.1080/106402601300187713). [PubMed: [16864371](https://pubmed.ncbi.nlm.nih.gov/16864371/)].
4. Heyward VH, Stolarczyk LM. *Applied body composition assessment*. Champaign, IL: Human Kinetics; 1996.
5. Altschuler J, Katz AD. Keeping your eye on the process: Body image, older women, and countertransference. *J Gerontol Soc Work.* 2010;**53**(3):200-14. doi: [10.1080/01634370903507589](https://doi.org/10.1080/01634370903507589). [PubMed: [20336569](https://pubmed.ncbi.nlm.nih.gov/20336569/)].
6. Knight T. Body image among older adults. *Encyclopedia of body image and human appearance*. San Francisco, California: Academic Press; 2012. p. 114-9. doi: [10.1016/b978-0-12-384925-0.00016-x](https://doi.org/10.1016/b978-0-12-384925-0.00016-x).
7. Roy M, Payette H. The body image construct among Western seniors: A systematic review of the literature. *Arch Gerontol Geriatr.* 2012;**55**(3):505-21. doi: [10.1016/j.archger.2012.04.007](https://doi.org/10.1016/j.archger.2012.04.007). [PubMed: [22578668](https://pubmed.ncbi.nlm.nih.gov/22578668/)].
8. Falkner NH, Neumark-Sztainer D, Story M, Jeffery RW, Beuhring T, Resnick MD. Social, educational, and psychological correlates of weight status in adolescents. *Obes Res.* 2001;**9**(1):32-42. doi: [10.1038/oby.2001.5](https://doi.org/10.1038/oby.2001.5). [PubMed: [11346665](https://pubmed.ncbi.nlm.nih.gov/11346665/)].
9. Schwartz MB, Brownell KD. Obesity and body image. *Body Image.* 2004;**1**(1):43-56. doi: [10.1016/S1740-1445\(03\)00007-X](https://doi.org/10.1016/S1740-1445(03)00007-X). [PubMed: [18089140](https://pubmed.ncbi.nlm.nih.gov/18089140/)].



10. Latorre Roman PA, Garcia-Pinillos F, Huertas Herrador JA, Cozar Barba M, Munoz Jimenez M. Relationship between sex, body composition, gait speed and body satisfaction in elderly people. *Nutr Hosp*. 2014;**30**(4):851-7. doi: [10.3305/nh.2014.30.4.7669](https://doi.org/10.3305/nh.2014.30.4.7669). [PubMed: [25335673](https://pubmed.ncbi.nlm.nih.gov/25335673/)].
11. Goswami DP. Ageing and its effect on body-self image, mood and self esteem of middle age women and older women. *IOSR Journal Of Humanities And Social Science*. 2013;**18**(5):53-73. doi: [10.9790/0837-1855373](https://doi.org/10.9790/0837-1855373).
12. Baker L, Gringart E. Body image and self-esteem in older adulthood. *Ageing Soc*. 2009;**29**(6):977-95. doi: [10.1017/s0144686x09008721](https://doi.org/10.1017/s0144686x09008721).
13. Grogan S. Body image and health: Contemporary perspectives. *J Health Psychol*. 2006;**11**(4):523-30. doi: [10.1177/1359105306065013](https://doi.org/10.1177/1359105306065013). [PubMed: [16769732](https://pubmed.ncbi.nlm.nih.gov/16769732/)].
14. [No authors listed]. Diet, nutrition and the prevention of chronic diseases. *World Health Organ Tech Rep Ser*. 2003;**916**:i-viii-backcover. [PubMed: [12768890](https://pubmed.ncbi.nlm.nih.gov/12768890/)].
15. Kucukdeveci AA, McKenna SP, Kutlay S, Gursel Y, Whalley D, Arasil T. The development and psychometric assessment of the Turkish version of the Nottingham Health Profile. *Int J Rehabil Res*. 2000;**23**(1):31-8. [PubMed: [10826123](https://pubmed.ncbi.nlm.nih.gov/10826123/)].
16. Hovardoğlu S. Body cathexis scale. *J Psychiatry Psychol Psychopharmacol*. 1993;**1**:26-32.
17. Perissinotto E, Pisent C, Sergi G, Grigoletto F, ILSA Working Group (Italian Longitudinal Study on Ageing). Anthropometric measurements in the elderly: Age and gender differences. *Br J Nutr*. 2002;**87**(2):177-86. doi: [10.1079/BJN2001487](https://doi.org/10.1079/BJN2001487). [PubMed: [11895170](https://pubmed.ncbi.nlm.nih.gov/11895170/)].
18. Chang SF. Frailty is a major related factor for at risk of malnutrition in community-dwelling older adults. *J Nurs Scholarsh*. 2017;**49**(1):63-72. doi: [10.1111/jnu.12258](https://doi.org/10.1111/jnu.12258). [PubMed: [27779822](https://pubmed.ncbi.nlm.nih.gov/27779822/)].
19. Morley JE. Frailty and sarcopenia in elderly. *Wien Klin Wochenschr*. 2016;**128**(Suppl 7):439-45. doi: [10.1007/s00508-016-1087-5](https://doi.org/10.1007/s00508-016-1087-5). [PubMed: [27670855](https://pubmed.ncbi.nlm.nih.gov/27670855/)].
20. Vernay M, Malon A, Oleko A, Salanave B, Roudier C, Szego E, et al. Association of socioeconomic status with overall overweight and central obesity in men and women: The French Nutrition and Health Survey 2006. *BMC Public Health*. 2009;**9**:215. doi: [10.1186/1471-2458-9-215](https://doi.org/10.1186/1471-2458-9-215). [PubMed: [19573222](https://pubmed.ncbi.nlm.nih.gov/19573222/)]. [PubMed Central: [PMC2714511](https://pubmed.ncbi.nlm.nih.gov/PMC2714511/)].
21. Noh JW, Jo M, Huh T, Cheon J, Kwon YD. Gender differences and socioeconomic status in relation to overweight among older Korean people. *PLoS One*. 2014;**9**(5). e97990. doi: [10.1371/journal.pone.0097990](https://doi.org/10.1371/journal.pone.0097990). [PubMed: [24836697](https://pubmed.ncbi.nlm.nih.gov/24836697/)]. [PubMed Central: [PMC4024045](https://pubmed.ncbi.nlm.nih.gov/PMC4024045/)].
22. Padez C. Trends in overweight and obesity in Portuguese conscripts from 1986 to 2000 in relation to place of residence and educational level. *Public Health*. 2006;**120**(10):946-52. doi: [10.1016/j.puhe.2006.05.023](https://doi.org/10.1016/j.puhe.2006.05.023). [PubMed: [16895735](https://pubmed.ncbi.nlm.nih.gov/16895735/)].
23. Ruiz-Arregui L, Castillo-Martinez L, Orea-Tejeda A, Mejia-Arango S, Miguel-Jaimes A. Prevalence of self-reported overweight-obesity and its association with socioeconomic and health factors among older Mexican adults. *Salud Publica Mex*. 2007;**49** Suppl 4:S482-7. doi: [10.1590/S0036-36342007001000007](https://doi.org/10.1590/S0036-36342007001000007). [PubMed: [17724521](https://pubmed.ncbi.nlm.nih.gov/17724521/)].
24. Tchicaya A, Lorentz N. Socioeconomic inequality and obesity prevalence trends in Luxembourg, 1995-2007. *BMC Res Notes*. 2012;**5**:467. doi: [10.1186/1756-0500-5-467](https://doi.org/10.1186/1756-0500-5-467). [PubMed: [22931792](https://pubmed.ncbi.nlm.nih.gov/22931792/)]. [PubMed Central: [PMC3494539](https://pubmed.ncbi.nlm.nih.gov/PMC3494539/)].
25. Kim G, Parmelee P, DeCoster J, Bryant AN, Chiriboga DA. The relation between body mass index and self-rated mental health among older adults: Do racial/ethnic differences exist? *Am J Geriatr Psychiatry*. 2014;**22**(7):661-9. doi: [10.1016/j.jagp.2012.08.011](https://doi.org/10.1016/j.jagp.2012.08.011). [PubMed: [23567431](https://pubmed.ncbi.nlm.nih.gov/23567431/)]. [PubMed Central: [PMC3989472](https://pubmed.ncbi.nlm.nih.gov/PMC3989472/)].
26. Coelho CG, Giatti L, Molina MD, Nunes MA, Barreto SM. Body image and nutritional status are associated with physical activity in men and women: The ELSA-brasil study. *Int J Environ Res Public Health*. 2015;**12**(6):6179-96. doi: [10.3390/ijerph120606179](https://doi.org/10.3390/ijerph120606179). [PubMed: [26035664](https://pubmed.ncbi.nlm.nih.gov/26035664/)]. [PubMed Central: [PMC4483695](https://pubmed.ncbi.nlm.nih.gov/PMC4483695/)].
27. An R, Shi Y. Body weight status and onset of functional limitations in U.S. middle-aged and older adults. *Disabil Health J*. 2015;**8**(3):336-44. doi: [10.1016/j.dhjo.2015.02.003](https://doi.org/10.1016/j.dhjo.2015.02.003). [PubMed: [25863703](https://pubmed.ncbi.nlm.nih.gov/25863703/)].